ventriculotomy and perfusion dictates a conservative approach when the cardiac defect is small enough to be well tolerated for life.

In children with larger shunts, operation may be advised before they enter school and are exposed to the multiple infections encountered in the schoolroom. On the other hand, there may be less psychological and physical morbidity in the older child who is often easier to work with in the postoperative period. A total assessment of the psychosocial dynamics of the family and the child are obviously helpful in determining the proper age for operation.

Occasionally one encounters a child in whom severe pulmonary vascular obstruction and a net right-to-left shunt across the defect have already developed. Symptoms may consist of exertional dyspnea, chest pain, syncope, and hemoptysis. The right-to-left shunt leads to cyanosis, clubbing, and polycythemia. At present there is little to offer this group of patients other than continuing support to the patient and his family.

Airway Obstruction in the Newborn

IN NEWBORN INFANTS, serious obstruction may occur at any level from the nose to the alveoli. Infants with lower airway obstruction breathe rapidly, with sternal, subcostal and intercostal retractions. With upper airway obstruction, they exhibit deeper inspiratory efforts with suprasternal retractions as well. Inspiratory stridor is characteristic of glottic and supraglottic obstruction; expiratory stridor occurs with obstruction below the larynx. Weakness or absence of cry is associated with pathologic change at the vocal cord level. A brassy cough is indicative of subglottic or tracheal obstruction.

The nose, nasopharynx and pharynx should be examined for obstructive lesions. Catheters are passed through the nose to test for posterior choanal patency. The larynx is examined by direct laryngoscopy, without anesthesia, in search for vocal cord paralysis, subglottic stenosis, webs or cysts. If no obstruction is noted above the trachea, a 3.5 mm bronchoscope may be passed to examine for tracheal obstruction, usually from extrinsic compression from a vascular anomaly or a mass in the neck or the mediastinum.

After first insuring an adequate airway, one may then deal with the cause of the obstruction. With mild obstruction, careful observation may be all that is necessary. In more severe obstruction, intubation or tracheostomy may be indicated.

Bilateral choanal atresia may be fatal in the newborn, who has not yet learned to breathe through his mouth. Insertion of an oral airway may be lifesaving. Transnasal resection of the obstruction can be performed in the newborn.

In neonates with micrognathia, the tongue may obstruct the airway, especially when the infant is attempting to feed, or is sleeping on his back. Some can be managed by prone positioning, and careful feeding with a lambs' nipple, which is softer and has a larger opening than standard nipples. More severe cases require surgical operation to hold the tongue forward. The best procedure is construction of flaps between the lower lip and the inferior surface of the tongue.

The leading cause of lower airway obstruction is respiratory disease syndrome (RDS) caused by a deficiency of surfactant, the component that decreases surface tension in the alveolae. With insufficient surfactant, the infant's alveolae expand only with high inspiratory pressures; they then collapse on expiration. Infants with this condition are managed with positive pressure. This is by either continuous positive pressure ventilation (CPPV), or continuous positive airway pressure (CPAP).

Prolonged endotracheal intubation for RDS of the newborn, if polyvinyl chloride tubes are used, seldom results in the laryngeal complications often seen in older children and adults. Reasons for this are: Polyvinyl chloride softens at body temperature and exerts little pressure on the larynx; also the cartilages of the newborn larynx are relatively soft and yielding.

When the obstruction is due to laryngeal anomalies, tracheostomy is usually necessary. It should be performed over a bronchoscope or an endotracheal tube, when possible. Size 000 tracheostomy tubes are designed for prematures; 00 tubes are used in neonates over 5 or 6 pounds. Among the metal tracheostomy tubes, the 65 degree angle of the Holinger design fits better in most newborn necks than the 90 degree angle of Jackson cannulas. Plastic, or silastic, infant tracheostomy tubes are softer and more flexible; theoretically, they should cause less tracheal irritation. They have two disadvantages, however. They lack inner cannulas, and their flexibility increases the danger of accidental decannulation.

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